



# Community and APG: Partners in Education

## ARL employees teach students about the chemistry of sports

Story and photo by  
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APG News

Six scientists and engineers from the U.S. Army Research Laboratory visited Halls Cross Roads elementary school Nov. 5 to conduct science demonstrations for 3rd and 4th graders to celebrate National Chemistry Week, which was Oct. 19-25. National Chemistry Week is a program sponsored by the National American Chemical Society and supported by the Maryland local section, states the Web site [www.membership.acs.org/m/md/](http://www.membership.acs.org/m/md/).

This year the theme for National Chemistry Week was “Having a Ball with Chemistry,” and demonstrations were aimed at teaching children the chemistry of sports.

“One of the big goals for National Chemistry Week is to enlighten students as to how chemistry is all around them, even in things that they normally don’t think about as scientific, like sports,” said Dr. Sandra Young, who works at the Propulsion Science Branch at ARL, and helped organize the activity. She added that ARL is actively involved in outreach activities at local schools.

“At the Army Research Lab, we have been organizing activities at local schools since 2000,” Young said.

Young opened her presentation by asking the students “What is not made out of a chemical?” and “Are chemicals good or bad?”

“The answer to the first question is that every-



*Darla Rawls, left, and Ryan Whittington, right, 3rd grade students at Halls Cross Roads Elementary School, listen as Neelam Mehta, a chemical engineer in the Explosives Technology Branch from the U.S. Army Research Laboratory explains a science demonstration that teaches the chemistry of swimwear Nov. 5, when six scientists and engineers visited the school’s 3rd and 4th grade classrooms to commemorate National Chemistry Week.*

thing is made out of chemicals - everything you can see, everything you can touch, everything you can smell and everything you can taste is made out of a chemical or chemicals, which is why we like to say that chemistry and a basic understanding of it is very important,” she said.

“Companies are constantly pushing products that make unbelievable claims, many of which are just that unbelievable and do not work. It’s more important than ever to be an educated consumer,” she said.

“The answer to the second question is that chemicals are both good and bad,” Young continued.

“We challenge students to think about examples where chemicals are good and bad. Tylenol is good if you have a headache but as with any approved drug, if taken in too large quantity or more than the directions tell you, you can overdose. Lead is bad in paint but a lead shield placed on you used to block x-rays when getting an x-ray at the dental office is good. Water is good - fundamental to life, but if you’re a marathon runner, you can’t drink just water or you’ll throw off your body electrolytes and become seriously ill.”

Young and the other scientists and the students discussed the chemistry

involved in making the swimwear for the 2008 Olympics, where swimmers wore swimsuits made from nylon and spandex. The scientists and engineers told the students that these materials are made of synthetic polymers, which allow the swimmers to glide quickly through the water because the materials have less drag than human skin.

The scientists told the children that these materials aided American Olympic swimmer Michael Phelps, in setting many records including winning 14 Olympic gold medals-the most of any Olympian.

In one experiment, the scientists demonstrated the chemistry of swimwear by asking the children to color a square using crayons and a piece of cloth. The students then dropped a small amount of water on the material. Depending on

how well they covered the surface of the cloth, the liquid formed a bead on the material, and did not soak the material. The scientists told the students that when trying to make better swimsuit materials scientists started small like this and compared the materials to the original cotton suits making nylon, then comparing rubber-coated suits to nylon and kept making small changes to get to the advanced materials that are used today by Olympians. This quickly ‘made’ material by the students being preferable to cotton because the water beads instead of being absorbed into the material, which would weigh down the swimmers.

In another experiment, the students examined two types of balls—one that they called ‘happy’ and one they called ‘sad’ — that looked the same and felt the same. Students made observations, noting that one ball weighed more and one ball bounced higher than the other, and determined that they must be made out of different materials.

The scientists pointed out that sports balls are made out of a variety of materials and they are made a specific way according to the way they are going to be used and for what purpose.

“For instance, you wouldn’t use a golf ball for tennis and you wouldn’t use a basketball for volleyball,” Young said.

The scientists and engineers also shared stories about why they chose their career and told the students how they can become scientists and engineers.

“It takes a lot of hard work in school in order to be successful,” said Cliff Hubbard, an ARL ceramics engineer.

Neelam Mehta, a chem-

ical engineer in the Explosives Technology Branch, said that she wants to get more involved in outreach efforts at local schools.

“When I was in eleventh grade I had a great chemistry teacher who influenced my decision to become a scientist. I wanted to inspire children by showing them that science can be fun,” Mehta said.

Marcia Cole, a gifted and talented teacher at Halls Crossroads who helped organize the event, expressed gratitude toward the scientists and engineers.

“The students love hands-on experiments, and I am grateful that the scientists and engineers from ARL volunteered their time,” Cole said. “This shows the students what opportunities they might have if they are interested in science and put effort into their school work.”

Young said that this year, to date ARL has been to 11 schools and five libraries with six more library visits and two school visits scheduled. About 25 volunteers from ARL, a few from the Maryland Section of the American Chemical Society (MD-ACS), which include some ARL employees, and some student members from the MD-ACS, have worked with more than 1,500 students in Harford, Baltimore, Cecil, Howard counties and Baltimore City.

Young said that ARL, in addition to other places on post, are active in many of the U.S. Army Educational Outreach Programs.

“There are many opportunities for students on post or in the area to participate in outreach programs,” Young said.

For more information about U.S. Army Educational Outreach Programs, go to [www.usaeop.com](http://www.usaeop.com).

## Four-star

*From front page*

graduating from the State University of New York at Cortland in 1975. She has graduate degrees in national resource strategy and

logistics management.

Her Family has a long history of military service, including her husband, who is a retired U.S. Air Force colonel.

“This promotion has taken me back in time like no other event in my entire life. And I didn’t appreciate the enormity of the event until the tidal wave of cards, letters and e-mails started coming my way,” Dunwoody said.

“I’ve heard from moms and dads that see this promotion as a beacon of hope for their own daughters, and an affirmation that anything is possible through hard work and commitment.”

Dunwoody also received congratulations and expressions of excitement from female veterans of previous wars.

The promotion is the latest first for women in the military, dating back to 1970 when Brig. Gen. Anna Mae Hays was promoted the first female general officer in the U.S. military.

In addition to receiving her fourth star, Dunwoody also took command of U.S. Army Material Command, headquartered at Fort Belvoir, Va., during an afternoon ceremony. As the commanding general, Dunwoody will oversee AMC headquarters’ move to Huntsville, Ala., under the 2005 Base Realignment Act. Prior to taking command, she served as the deputy commanding general and chief of staff of AMC.

“Today is all about two simple words: thank you,” Dunwoody said.

*(Editor’s note: Reports from AMC Public Affairs and Elizabeth M. Collins contributed to this article.)*